Spring 5-1906

# Volume 15 - Issue 8 - May, 1906

Rose Technic Staff
*Rose-Hulman Institute of Technology*


VOL. XV. TERRE HAUTE, IND., MAY, 1906. No. 8

# THE TECHNIC.



TERMS:
One Year, $1.00. Single Copy, 15 cents.
*Issued Monthly at the Rose Polytechnic Institute.*
Entered at the Post Office, Terre Haute, Indiana, as second-class mail matter.

MEMBERS of the Senior Class have returned from Louisville with glowing accounts of the good time they had as guests of the Rose Tech Club of that city. About thirty of the men accompanied the Track Team on its trip and saw the meet with Kentucky State College at Louisville on May 5. The meet was an easy victory for Rose, as our boys completely outclassed the Kentuckians in every event.

After the meet, all the visiting Rose men were entertained to an informal luncheon at the Club's rooms. Several of the older Alumni gave some reminiscences, and the plans for the coming week were discussed. The class was to meet each morning at the Interurban Union Depot, and from there proceed in a body to the places on the day's programme.

Monday morning was spent in inspecting the Water Purification Works of the Louisville Water Company, under the guidance of Burk, '96, Chief Chemist and Bacteriologist for the company, and Krieger, '03, Chief Draughtsman. The plant is yet unfinished, but when completed will have a capacity of forty-eight million gallons per twenty-four hours, with ample room for doubling the capacity. After a two-mile stroll down "Pipe Line Avenue," the pumping station at the river was visited. While the new pumping engine with its thirty-six foot fly wheel was of interest, the chief attraction here was a pair of old Cornish pumping engines which have been in service for nearly fifty years. The engines use steam at thirty pounds pressure, and although not as economical in steam consumption as more modern types, are still used in almost daily service.

In the afternoon the party visited the gas works, and then the United States Cast Iron Pipe Foundry.

On Tuesday the class saw the power house of the Louisville Lighting Company, and then the plant of the Henry Vogt Machine Company. This company makes a specialty of the Henry Vogt Water Tube Boiler, and refrigerating machinery, but also manufactures all kinds of power machinery. In its machine shop all belting and shafting is avoided by the use of individual motor drive for each machine. The whole plant is very roomy and well lighted, giving one a splendid idea of a complete and up-to-date shop.

In the afternoon a private street car took the party to the Street Railway Power House, and later to the car repair shops and one of the trans-

former sub-stations. The power house furnished an excellent illustration of the modern methods of power generation. Most of the generators are direct current, 550 volt machines. For suburban work, however, alternating current is used, being transmitted at 13,200 volts, and then transformed to 600 volt direct current by rotary converters at the various sub-stations.

Under the guidance of Miller, '95, Meriwether, '96, and Mr. Ben Grosvenor, formerly of Rose, the party then visited the storage battery house, repair shop and one of the sub-stations. Brownell, '86, then took the party through the power and refrigerating plant of the Weissinger-Gaulbert Apartment House.

On Wednesday, the Louisville Packing Company's plant and the Cumberland Telephone Exchange were visited in the forenoon, and the Portland Canal, Government Locks and Kentucky and Indiana Bridge in the afternoon.

All of Thursday morning was spent at the Louisville and Nashville Railway shops, which furnished another illustration of a modern shop, complete in every detail. In the afternoon, the last inspection trip was made. Through the courtesy of Speed, '95, a private car was attached to a regular Pennsylvania train, and the Rose men were taken to Speeds, Indiana, where the works of the Louisville Cement Company are situated. From here the private railroad of the company took the party to the quarries, and then back to the works. Here the greater part of the afternoon was spent, inspecting the cement kilns, grinding machinery, and the more modern Portland cement machinery.

The last place visited was the chemical laboratory, and here the Seniors found a pleasant surprise awaiting them. The main room was decorated with Rose pennants and Old Rose and White streamers, and in the center was a large table loaded down with good things to eat. The boys showed their appreciation of this feast as only a hungry crowd can. "Nine Rahs for Mr. Speed" were given with a will, and were followed by the college yells.

The visit to Speed concluded the 1906 Senior Trip, as nearly all the boys returned to Terre Haute the next morning. The Seniors unite in praising the hospitality of the Louisville Alumni, and in the name of the Class, THE TECHNIC thanks them heartily for their kindness in making the trip possible. We also thank the various men in charge of the different places visited for the many courtesies they extended; and finally, we thank the Faculty for the very material assistance which they contributed.

THE Board of Editors met on May fourteenth for the purpose of electing their successors. The following men were chosen to take charge of THE TECHNIC for next year:

Editor in Chief, . . . . . CARL B. ANDREWS
Business Manager, . . . . . WILLIAM C. KNOPF
Assistant Editor, . . . . . HARRY D. BAYLOR
Reviews, . . . . . HARRY H. ORR
Alumni, . . . . . ERWIN J. MINER
Athletics, . . . . . J. BOYD SHICKEL
Local . . . . . EMIL J. FISCHER, EDWARD M. BRENNAN
Artist, . . . . . RUSSELL S. SAGE

Mr. Andrews has been a member of the staff for two years, and on account of his experience and ability is very well qualified for the position.

Mr. Knopf has held the position of Assistant Business Manager, and judging by the work he has done in this capacity we may rest assured that the financial end of THE TECHNIC will be in capable hands.

The Assistant Editorship goes to Mr. Baylor, and while he has only a few months' experience on THE TECHNIC staff, he has shown an interest in his work which assures us that the "Rose Leaves" department will be well taken care of.

Mr. Orr, as Reviews Editor, is a new man on THE TECHNIC, but one, we believe, who will make his department well worth reading.

Mr. Miner has previously served as Local Editor, and is well able to take charge of Alumni. Athletics will be taken care of by Mr. Shickel. He has held a similar position on the *Modulus* staff, and comes highly recommended.

The Local Editors, Messrs. Fischer and Brennan, should keep our readers well informed as to what is going on in school. Both men take a

lively interest in school affairs, and with the co-operation of the student body will doubtless furnish a good "Differential" column.

Mr. Sage was re-elected to his position of artist, and will again add attractive sketches to our columns.

This staff will have charge of the June issue, as has been the custom for several years. In this way the new men familiarize themselves with their new duties while the old staff is still here to help them.

Before surrendering our position as Editor, we desire to express our sincere appreciation of the assistance given us by the members of the Editorial Board, not only in gathering material, but also in reading proof. We also wish to thank our contributors, for without them we would indeed have been helpless; also Mrs. Burton, for her assistance in gathering Alumni notes, and for her many valuable suggestions. And finally we thank Mr. Post for the able way in which he has conducted the management, making it unnecessary to cut down the size of our issues, in spite of a very material increase in the price of printing.

In turning over the work to Mr. Andrews, we can think of nothing better to wish him than this: that his duties may be made as pleasant as ours have been.

OUR dual meet with Wabash on May 12 proved a defeat for our Track Team, but will long be remembered on account of the excellent records made in several of the events. Rose won eight of the thirteen events, Wabash making most of her points on second places.

The records made by Turk, of Rose, and Andrus, of Wabash, will make some of the larger colleges of the State open their eyes. Turk equalled the Amateur World's Record in the hundred yard dash, running it in nine and four-fifths seconds. The time was caught by the three official timers, and also by Coach Cayou, of Wabash, and all four watches checked exactly.

Andrus, of Wabash, ran the high hurdles in fifteen and four-fifths seconds, which is exceptionally fast time, two-fifths of a second better than the state record.

Turk also set a new mark in the running broad jump, clearing twenty-three feet four and a half inches. This shows Turk to be probably the best broad jumper in the country today. His records are all the more remarkable in view of the fact that he competed in seven events, in all of which he won first place. We believe that we have a right to the claim that in Turk Rose has one of the very best athletes in the country.

NEWSPAPER reports have been current all over the country to the effect that Hugh Annis, a Rose graduate, had invented a new wireless telegraph instrument. Dr. Mees made the statement that to the best of his knowledge no one of that name ever attended Rose, but that if he did he certainly never graduated.

COMMENCEMENT takes place on Thursday morning, June seventh, while the final examinations close on the preceding Saturday. The commencement exercises should be of interest to every Rose man, and it seems as if a better representation should be in the city than has usually been the case. When you have the whole summer before you, it is surely not expecting too much of you to ask you to wait four days and attend the exercises.

# MASONRY ARCHES AND THE ELASTIC THEORY.

By MALVERD A. HOWE.

THE majority of the masonry arches have been designed by precedent. With the great amount of data at hand of structures built and standing, this can be done with a feeling of security. However, any arch which differs materially from one already built, cannot be so designed with the same confidence. Theory after theory has been advanced for determining the stresses in masonry arch rings or their proportions, but all have either been too complicated or too empirical to come into general use.

European engineers have recognized for a long time that the elastic theory of the arch—almost universally applied in the designing of metal arches—is quite applicable to masonry arches and have designed many large structures upon the lines demanded by the theory.

One of the objections to using the theory is the long and tedious calculations involved unless one becomes quite familiar with the formulas and their derivation. Another serious objection is that the dimensions of the arch ring must be assumed and tested by the theory to see if it has the proper proportions.

While the application of the elastic theory cannot be made as simple as the designing of steel beams, yet the formulas for $H_1$, the horizontal thrust for vertical loads, and $M_1$ the bending moment at the left support for the same loading, can be reduced to forms quite easy to use in the case of symmetrical arches of any form.

For the determination of $H_1$ the general formula can be reduced to

$$2H_1 = \frac{\Sigma m_x \Delta \left(y - \frac{\Sigma y \Delta}{\Sigma \Delta}\right)}{\Sigma y \Delta \left(y - \frac{\Sigma y \Delta}{\Sigma \Delta}\right)} = \frac{\Sigma m_x B}{C}$$

in which $\Sigma$ represents summation between 1 and 0.

$\Delta = \delta s \div$ moment of inertia of the arch ring at the section having the coordinates x and y.

$m_x =$ the ordinary bending moment for the given load and an equal and symmetrical load with reference to the center of the span.

The general nomenclature is evident from Fig. 1.

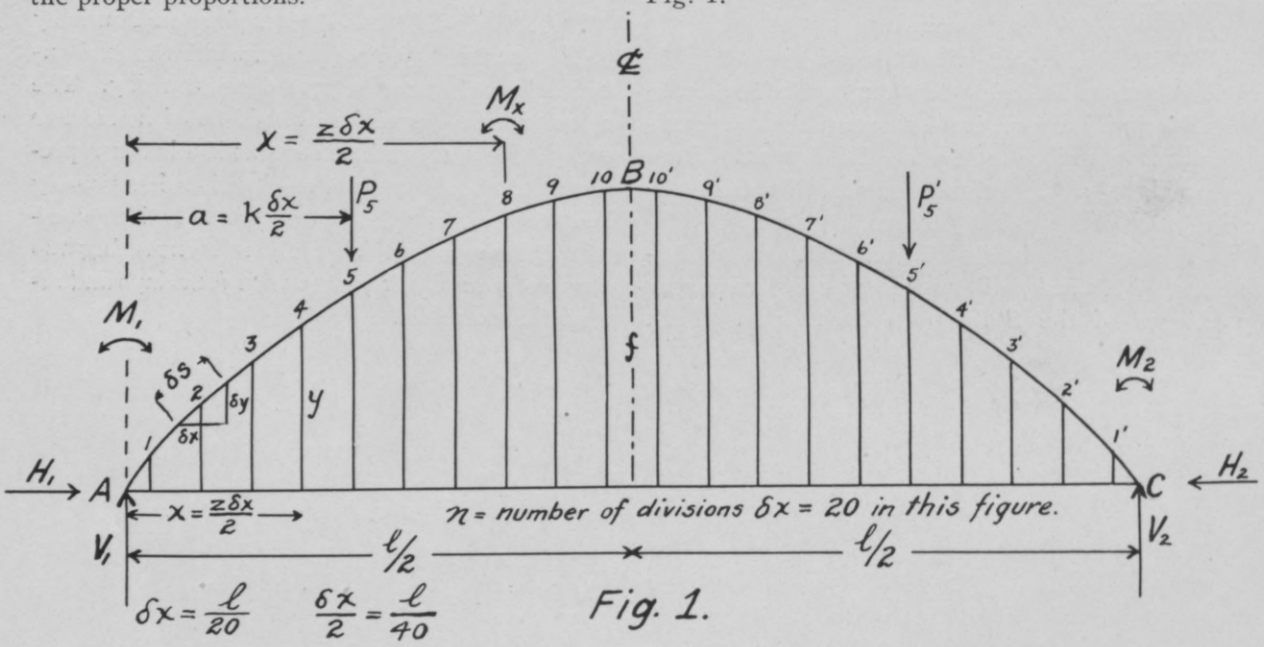



Fig. 1.

## TABLE I. COMPUTATIONS FOR $H_1$

| Point No. | $\Delta$ | y | $y\Delta$ | $y-\frac{\Sigma y\Delta}{\Sigma\Delta}$ | $\Delta\left(y-\frac{\Sigma y\Delta}{\Sigma\Delta}\right)=B$ | $y\Delta\left(y-\frac{\Sigma y\Delta}{\Sigma\Delta}\right)=C$ | z | k | zB | $\sum_{x=0}^{x=a} zB$ | $\sum_{x>a}^{x=\frac{l}{2}} B$ | $k\sum_{x>a}^{x=\frac{l}{2}} B$ | D | $2H_1=\frac{D}{\frac{1}{2}\Sigma C}\frac{\delta x}{2}P$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.83 | 0.81 | 0.672 | -6.0809 | -5.047 | -4.0882 | 1 | 1 | -5.047 | -5.047 | 5.050 | 5.050 | 0 | 0.0 $P_1$ |
| 2 | 1.23 | 2.28 | 2.804 | -4.6109 | -5.671 | -12.9308 | 3 | 3 | -17.013 | -22.060 | 10.721 | 32.163 | 10.103 | 0.166 $P_2$ |
| 3 | 1.77 | 3.58 | 6.337 | -3.3109 | -5.860 | -20.9798 | 5 | 5 | -29.300 | -51.360 | 16.581 | 82.905 | 31.545 | 0.519 $P_3$ |
| 4 | 2.53 | 4.70 | 11.891 | -2.1909 | -5.543 | -26.0520 | 7 | 7 | -38.801 | -90.161 | 22.124 | 154.868 | 64.707 | 1.064 $P_4$ |
| 5 | 3.62 | 5.65 | 20.453 | -1.2409 | -4.492 | -25.3801 | 9 | 9 | -40.428 | -130.589 | 26.616 | 239.544 | 108.955 | 1.793 $P_5$ |
| 6 | 5.01 | 6.43 | 32.214 | -0.4609 | -2.309 | -14.8476 | 11 | 11 | -25.399 | -155.988 | 28.925 | 318.175 | 162.187 | 2.669 $P_6$ |
| 7 | 6.73 | 7.05 | 47.447 | +0.1591 | +1.071 | +7.5487 | 13 | 13 | +13.923 | -142.065 | 27.854 | 362.102 | 220.037 | 3.621 $P_7$ |
| 8 | 8.74 | 7.52 | 65.725 | +0.6291 | +5.498 | +41.3475 | 15 | 15 | +82.470 | -59.595 | 22.356 | 335.340 | 275.745 | 4.538 $P_8$ |
| 9 | 10.55 | 7.83 | 82.607 | +0.9391 | +9.908 | +77.5758 | 17 | 17 | +168.436 | +108.841 | 12.448 | 211.616 | 320.457 | 5.274 $P_9$ |
| 10 | 11.43 | 7.98 | 91.211 | +1.0891 | +12.448 | +99.3383 | 19 | 19 | +236.512 | +345.353 | 0 | 0 | 345.353 | 5.683 $P_{10}$ |
| | 52.44 / 2 | | 361.361 / 2 | | -28.922 / +28.925 | -104.2785 / +225.8103 | | | | | | | | 25.327 |
| | 104.88 | | 722.722 | | .003 | +121.5318 | | | | | | | | |
| | $\Sigma\Delta$ | | $\Sigma y\Delta$ | | $\frac{1}{2}\Sigma B$ | $\frac{1}{2}\Sigma C$ | | | | | | | | |

If the values of $H_1$ are desired for a load at each point of division of the arch respectively, then if $k=\frac{2a}{\delta x}$ and $z=\frac{2x}{\delta x}$

$$\frac{1}{2}\Sigma m_x B=\left[\sum_{x=0}^{x=a} zB+k\sum_{x>a}^{x=\frac{l}{2}} B\right]\frac{\delta x}{2}P=D\frac{\delta x}{2}P$$

*and*

$$2H_1=\frac{D}{\frac{1}{2}\Sigma C}\frac{\delta x}{2}P$$

To show the application of this formula assume an arch ring whose axis has a span of 40 feet and a rise of 8 feet, and suppose that the values of $\Delta$ have been found when the span is divided into twenty equal parts. Table I shows in detail the calculation of the $2H_1$ for each load upon the left of the center. One-half of the quantities $2H_1$ will be the values of $H_1$ for single loads. For example, $H_1$ for a load at point 5 is equal to $0.896\ P_5$. For a uniform load over all of w per linear unit of span, $H_1=25.327\ (w\delta x)$.

The above method has one property which is valuable in that the work is easily checked. $\Sigma B=0$ when the computations are correct. In Table I the discrepancy is 3 in the third place of decimals. The value of D and consequently $H_1$ found at the first point of division should be zero mathematically. Actually $H_1$ is not zero until the load is over the support. This discrepancy is due to using a finite value $\delta x$ instead of the differential.

Another check is the computation of $H_1$ for a unit load at each point of division, and comparing the result with the sum of the values found in Table I. The results should be identical. Table II shows this calculation in detail and the result agrees with that in Table I until the third decimal place where the difference is *one.*

The form shown in Table II can be used for any symmetrical loading.

The formula for $M_1$ and $M_2$ may be written

$$M_1 \text{ or } M_2 = H\frac{\Sigma y\Delta}{\Sigma\Delta} - \left\{\frac{\Sigma m_x\Delta}{\Sigma\Delta} \pm \frac{\Sigma m_x\left(x-\frac{l}{2}\right)\Delta}{\Sigma\Delta\left(\frac{1}{2}l-\frac{\Sigma x^2\Delta}{\Sigma x\Delta}\right)}\right\}$$

For $M_1$ use the + sign and for $M_2$ the − sign before the last term.

All the quantities in $H\frac{\Sigma y\Delta}{\Sigma\Delta}$ are known from previous calculations.

$$\Sigma m_x\Delta = \left\{\sum_{x=0}^{x=a} z\Delta + k\sum_{x>a}^{x=\frac{l}{2}}\Delta\right\}\frac{\delta x}{2}P$$

$$\Sigma m_x\Delta\left(x-\frac{l}{2}\right) = \left[(n-k)\sum_{x=0}^{x=a} z(z-n)\Delta - k\sum_{x>a}^{x=\frac{l}{2}}(z-n)^2\Delta\right]\frac{\delta x^2}{2}\frac{P}{n}$$

$$\Sigma\Delta\left(\frac{1}{2}l-\frac{\Sigma x^2\Delta}{\Sigma x\Delta}\right) = \left(n-\frac{\Sigma z^2\Delta}{\Sigma z\Delta}\right)\frac{\delta x}{2}\Sigma\Delta$$

The above expressions are very quickly computed.

The above equation has the advantage over all previous equations published in that it is necessary to use but half of the loads in order to determine $M_1$ and $M_2$ for all of the loads. The value of $M_1$ for a load at 1 is the value of $M_2$ for a load at 1′ and conversely the value of $M_1$ for a load at 1′ is the value of $M_2$ for a load at 1.

In the case of symmetrical loading

$$M_1 = M_2 = H_1\frac{\Sigma y\,\Delta}{\Sigma\Delta} - \frac{\Sigma m_x\Delta}{\Sigma\Delta}$$

where $m_x$ is the ordinary bending moment for the given loading.

The numerical work has been taken from a series of calculations recently made by Prof. McCormick.

**TABLE II.**

| Point No. | P | z or k | $\Sigma P(z-k)$ | * $R_1 z$ | * $m_x = R_1 z - \Sigma P(z-k)$ | B | $m_x B$ |
|---|---|---|---|---|---|---|---|
| 1 | 1 | 1 | 0 | 10 | 10 | -5.047 | -50.470 |
| 2 | 1 | 3 | 2 | 30 | 28 | -5.671 | -158.788 |
| 3 | 1 | 5 | 6 | 50 | 44 | -5.860 | -257.840 |
| 4 | 1 | 7 | 12 | 70 | 58 | -5.543 | -321.494 |
| 5 | 1 | 9 | 20 | 90 | 70 | -4.492 | -314.440 |
| 6 | 1 | 11 | 30 | 110 | 80 | -2.309 | -184.720 |
| 7 | 1 | 13 | 42 | 130 | 88 | +1.071 | + 94.248 |
| 8 | 1 | 15 | 56 | 150 | 94 | +5.498 | +516.812 |
| 9 | 1 | 17 | 72 | 170 | 98 | +9.908 | +970.984 |
| 10 | 1 | 19 | 90 | 190 | 100 | +12.448 | +1244.800 |
| The common factor $\frac{\delta x}{2}$ has been omitted in this table, and introduced below. | | | | | | | +2826.844 |
| | | | | | | | -1287.752 |
| | | | | | | | 1539.092 |

$$2H_1 = P\frac{\frac{1}{2}\Sigma m_x B}{\frac{1}{2}\Sigma C}\frac{\delta x}{2} = \frac{1539.092}{121.5318}(2) = 25.328P$$

$P = w\delta x$ for uniform loading.

* $R_1$ = reaction for beam supported at ends.
$m_x$ = moment " " " " "

## ALUMNI NOTES.

Irving J. Cox, '03, has gone from the Armour Company, of Chicago, to the Eastern Dynamite Co., whose works are located at Gibbstown, New Jersey. He is foreman of one of the departments of the Acids Works.

Edward A. Weller, '88, has been appointed Superintendent of the Burge Mfg. Co., Canton, Ohio.

J. H. Barbazette, '04, has taken a position with the Chicago Portland Cement Co., at Ogles by, Illinois.

William A. Peddle, '03, has resigned his position with the Interborough Rapid Transit Co., to take that of Assistant Signal Engineer of the New York Central Railway in New York City.

A. G. Shaver, '97, who has been Signal Engineer for the Union Pacific R. R. Co., at Omaha, Neb., has taken a position with the Hall Signal Company, New York City.

Arthur P. Stone, '99, has been transferred from Cleves, Ohio, to Mattoon, Ill., on the Big Four Railway. He is Chief Assistant to L. S. Rose, '93, Engineer Maintenance of Way.


# INDEXING TECHNICAL PERIODICALS.

By HARRISON W. CARVER, '95.

IN recent years there has been a great increase in the magnitude of the technical press and also in its efficiency as a collector and disseminator of engineering information. Accompanying this there has been an increased necessity for the study of the periodical literature by the engineer. Present day development of engineering covers such a wide field and changes in character so rapidly that the engineer is no longer able to rest on the knowledge resulting from his personal experience and observation, but learns more and more that the scientific journal is an absolutely necessary tool instead of a luxury, and that a set of bound magazines is very often an invaluable aid in practical work.

As the field of the magazine is nearly always more extensive than that of the single engineer or firm, it is usually found convenient to arrange some system for indexing such portions of its contents as seem especially useful to one's individual work. This is all the more necessary as many of the journals are but poorly indexed. Often, too, a particular portion of an article is of importance, and is not indicated in the general title. For these and other reasons most engineers find it advantageous to make a personal index of the material they will probably need.

The variety of schemes which have been tried for this purpose approaches in number the total attempts to make indexes. The earliest scheme was probably the simple note book list of references. This makeshift soon becomes too bulky to be of value and requires almost as much hunting as a search for the original volumes. Another method sometimes used is to cut out desired articles and file them in envelopes or filing cases under any heading desired. This mutilates the magazine and the clippings are easily lost or destroyed.

To secure the desired flexibility and ease of reference the best method undoubtedly consists in the adoption of one of the two modern devices for classifying and cataloging matter, the card index and the loose-leaf book. The card system is the more popular of these, but for much of the work the other seems equally practicable. It is easier to insert material in the card tray than in the book, but the book is handier to carry and the thinner paper used makes the index much less bulky. Personally, I prefer cards for indexes which grow rapidly and the books for indexes on subjects concerning which but little is published.

One finds a variety of sizes to choose from in the market. The standard size of the American Library Association is 7.5 cm. x 12.5 cm., and this is large enough for indexing purposes. Too large a card wastes space, it is better to some-

times use two for a single note. In case this size is adopted care must be taken when ordering that one does not receive the 3 in. x 5 in. card. This size is also on the market, and while the difference between the two is not noticeable on casual inspection, it causes great annoyance in use. All cards should be accurately cut to size; a die cut card is much preferable to a sheared one. A good quality card proves its worth over those of cheaper grade by its superior life.

Loose-leaf books are now made of such size that a writing surface 3 in. x 5 in. is given. An advantage secured is that a small book can be carried in the pocket for notes, which can be filed later in thicker binders, 3 in. thick, for storage. Cases similar to those for card trays are on the market in which each book occupies a separate pigeon-hole. The effect is much the same as that of the card index case.

The choice of a system lies between these two forms. The card system permits more rapid interpolation of entries, but is more bulky. The book can be carried about with greater ease or allowed to lie on the desk.

So much for the apparatus of the index, which, while important, is a small matter compared with the question of the arrangement of the material collected. We have here a choice of filing our cards or slips alphabetically under selected subject headings, or by some careful classification which will bring related subjects into close proximity.

Usually the former plan is first tried, but often ends in disaster. Unless a carefully chosen list of headings is made and conformed to there is great danger that material will gradually become scattered under various synonymous headings. Then, too, if more than one person is to use the index, numerous cross-references will be needed. These reasons, in addition to the fact that this arrangement often widely separates closely related subjects, make an index planned along the lines of some classification more desirable for engineering material.

Such a classification scheme may either be made for the special case in hand or may be selected from the many in print. The latter course is advisable, as the schemes available are suitable to almost any need, while the labor of compiling a new form is greater than appears at first sight.

The classifications which seem most popular are those based on that invented by Melvil Dewey, which is used in most American libraries. This classification divides the entire field into ten groups, which are numbered from 000 to 900. Each of these is then subdivided into ten sections, and so on. For instance, the class of Useful Arts, 600, is divided into: 600, General; 620, Medicine; 620, Engineering; 630, Agriculture; 640, Domestic Economy; 650, Communication; 660, Chemical Technology; 670, Manufactures; 680, Mechanic Trades; 690, Building. These classes are then again divided in the same manner.

It is obvious that this scheme is elastic enough to satisfy any requirements in the way of subdivision, as there is no limit to the possibility of extension by the addition of sufficient figures. The classification has been carefully worked out and serves admirably in practice. Theoretically numerous objections can be raised, but the ideal classification remains but an ideal, and the one described will be found thoroughly efficient. The only objection of moment has been the fact that in some divisions, and particularly those relating to engineering, the tables have not been extended sufficiently to permit a close classification of such material as magazine articles, monographs on special points, etc. This has led a number of workers to make expansions of special divisions, some of which are very useful and answer all requirements for workers in the same field. They are not always so easily used, however, by engineers in slightly different lines, as they always are devised from some particular point of view and classify from that standpoint. Most articles can be referred with equal propriety to one of two or more classes, but this is forgotten in many schemes of classification.

The most comprehensive scheme at present in print is undoubtedly the one published by the Institut Internationale de Bibliographie, 1 Rue

du Musée, Brussels. This is an expansion of the Dewey classification which is sufficiently extended to meet almost any requirements. It has not been published in English as yet, but the slightest knowledge of French suffices to make it available. The numbers assigned by Dewey have been retained, the changes being made as additions and interpolations. This classification seems to be but little known in America, which is unfortunate, as it seems well adapted to the needs of the engineer and the scientific worker.

There are a number of other extensions of special divisions of the Dewey classification available, most of which have been published in various technical periodicals. One of the best of these has been devised by the Mechanical Engineering Department of the University of Illinois and published in pamphlet form. This covers only mechanical and railroad engineering, but is very well adapted to requirements in those lines.

In making an index the easiest way seems to be to read with card in hand, filling out the card at the time. When a number have collected they can be classified and the number written in the upper corner. The cards are then filed in the correct order.

A considerable amount of labor can be saved by making use of the index slips which many periodicals now furnish, either printed on one side of loose sheets or in the advertising section, whence they may be clipped. These can be pasted on cards and the number and any further note added. There are also a number of indexes published in a form suitable for clipping, as the Engineering Index, 140 Nassau Street, New York; the Mining Index, 135 William Street, New York, and the Index Technique, 1 Rue de Musée, Brussels. Each of these indexes a long list of technical magazines. The last has the advantage that the classification numbers are added, so that no work but clipping, pasting and filing need be done. Any individual comment may be added to suit special needs.

Another advantage secured by the use of the classification of the Institut Internationale de Bibliographie and the 7.5 x 12.5 cm. card is that it is possible to purchase complete card indexes covering some lines, printed on cards of this size, classified and ready for filing. There will no doubt be an increase in the amount of such material available as time goes on, which makes it seem advisable to adopt this system and size in beginning new indexes.

It is remarkable how rapidly an index grows when once begun and how soon it becomes a useful office assistant. It may be used to refer to magazine articles, pamphlets, chapters and tables in books, etc. Brief memoranda may be incorporated as a whole. It is not necessary to restrict it to matter immediately available, as in many cases public and other libraries can be called on to supply the article if one knows just what is wanted. In many cases the maker of the index relies almost entirely on public institutions for the data to which his personal index is a guide. In any case, the question of obtaining desired information is an easy one compared to that of finding what publications contain it.

---

## ALUMNI NOTES.

Chicago, Ill., May 13, 1906.

*Editor of The Technic:*

It is so seldom that an opportunity is offered to report a *bona fide* meeting of the Chicago Rose Tech Club, that I feel that when one is held it should be made a matter of record.

You have, from time to time, reported the feeble efforts of a few of the Alumni here in Chicago to greet and cheer on to victory our various athletic teams that have contested here. Last night, upon mention of the recent game of base ball with Armour Institute, the question "when?", that reverberated around the table, may in a measure explain why these efforts have not been more united. "Why don't the boys drop each man a postal, stating date and place, several days before the game?" This question, that also arose, is

offered as a suggestion to future managers of the teams as a possible solution of the "when" problem.

The card quoted below constituted the call for the second meeting of the club held within the three years that I have resided in Chicago:

*To the Alumni of the Rose Polytechnic Institute:*

There will be a meeting and dinner of the Chicago Rose Tech Club, Saturday evening, May 12th, at the Union Restaurant, 111 East Randolph Street, Chicago, at 6:30 P. M., $1.00 per plate.

T. L. Condron, '90, Alumni Member of the Board of Managers, will make a report and other matters of importance will be taken up. A large attendance is desired and arrangements for room, etc., can only be made after responses are all in. Invite all alumni you know to attend and notify C. H. Fry, Room 375 Old Colony Bldg., Tel. Har. 35. PLEASE RESPOND ON ATTACHED CARD AT ONCE.

To this call the following eighteen Alumni responded:

| | |
|---|---|
| Theodore L. Condron, '90, | Marion W. Blair, '03, |
| Archie Wade, '95, | John A. Cushman, '03, |
| Frank F. Sinks, '96, | Earl C. Metzger, '03, |
| Charles H. Fry, Jr., '97, | H. Blair Pettit, '03, |
| J. Milton Platts, '99, | Roy W. Hill, '04, |
| John T. Dickerson, '02, | F. W. Hahn, '04, |
| Fred. B. Fishback, '02, | William S. Hanley, '05, |
| Don F. Osborne, '02, | Lorenz W. Klenk, '05, |
| Edgar B. Powell, '02, | Edward H. Spalding, '05. |

As the roll was being called the prevailing excuse offered for those not present was "Married," sometimes modified to the better excuse, "Recently married." The necessity of such excuses was not much of an encouragement to the bachelors present to foresake the state of single blessedness, but the effect was somewhat moderated by the fact that a glance around the table revealed the fact that many present were married. Yes, and even some recently married.

After dinner, when the cigars had been lighted, Mr. Theodore L. Condron, one of the Alumni Representatives on the Board of Managers, introduced the discussion with an interesting and instructive report in regard to the affairs of the Institute, and called for an expression of the views of those present, so that he would be the better enabled to represent the interest of the alumni.

The discussion was quite free upon both general and specific questions, and will no doubt result in bringing to the attention of the board many points that the alumni feel are of importance to the best interests of the Institute.

The meeting closed with a vigorous rendition of the R. P. yell, and all left with the feeling that the tie of common interest had been closer drawn.

I think that one of the members of the class of 1902 voiced the common sentiment when he said, "Since the ball game last Saturday and the meeting to-night, I feel more of a Rose man than I have at any time within the four years since I graduated."

Sincerely,

H. Blair Pettit.

---

N. Hadley Cox, '03, who has been in the apprentice department of the General Electric Company at Schenectady, has taken a position with the Naugatuck Malleable Iron Co., of Naugatuck, Conn.

---

Through Mr. Brent Wiley, '98, Commercial Engineer for the Westinghouse Electric Co., we have that M. C. Rypinski, '97, who has been President of the Simplex Co., at Newark, N. J., has taken a position in the Instrument department of the Westinghouse Company at Pittsburgh.

---

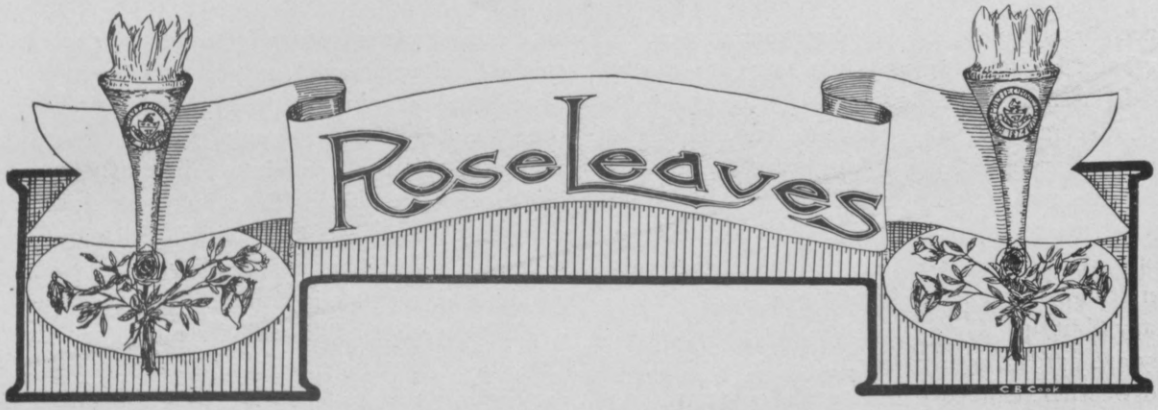
Edw. G. Waters, '88, who has been Manager of the Commercial Departments of the British Thomson-Houston Co. for the past three years, and located at Rugby, England, has returned to this country and resumed his position of Assistant to the First Vice-President of the General Electric Co., at Schenectady.

---

Guy W. Greenleaf, '05, has taken a position with the Atlas Engine Works at Indianapolis.

---

Brent C. Jacobs, '03, has gone to the General Electric Co., in Pittsburg, and is in the Railway Department.




# LUMBERING IN MINNESOTA.

By ROY F. TYLER, '09.

THE lumbering operations in our Northern states—Minnesota, Wisconsin and Michigan—are of necessity being carried out along more economical lines year by year, and great care is taken to get out all that the forests have to give. Formerly the lumberman would only cut his white pine and do that in a very wasteful manner. Quite often in burning over his land after his timber had been cut he started forest fires which would cost millions of feet of good pine, and in many cases lives of settlers. In the last few years, however, the lumber dealers have come to realize that white pine is not the only timber that is of commercial value. He has now found a use for almost every variety of timber that he finds on his land, including jack pine, spruce, hemlock, birch, tamarack and poplar, all of which he uses more carefully and in smaller sizes than he had thought practical before.

In order to give some idea of the extent of the logging operations we may say that the yearly cut is about ten billion feet in these three states of Minnesota, Wisconsin and Michigan, and if we take the logs in a ten years' cut they would make a pile forty feet high by four hundred feet wide and reach further than from New York to San Francisco.

Now let us pass on to the more personal side of our subject, which deals with the logger, the man of the forest and the river. In our Northern cities he is quite a familiar character, especially in the Fall of the year, when he is preparing for his winter's work. As we see him waiting around some employment office he is usually dressed in a sweater or heavy woolen shirt, Mackinaw coat and pants of red or some bright plaid; on his feet he has rubbers with high leather tops, inside of which he wears several pairs of heavy wool socks, and on his head a good warm cap that will pull well down over his ears. In nationality seventy-five per cent are Scandinavian and most of the rest of them are Scotch or French Canadian.

We will now suppose that he has found a job that he thinks will suit him, for he is very particular about the company he works for and in what locality the work is to be done. He arrives at the nearest railroad station, from which he will sometimes have to walk ten or fifteen miles to the camp, which is to be his home for the next four months, provided the boss and grub suit him and he suits the boss.

The camp has been constructed during the summer, and although it is but temporary and rude, it is quite comfortable. It is long and low, built of logs, and has an almost flat roof of boards covered with tarred paper or of poles thatched with hay. Along the inside are shelf-like bunks two tiers high. In the middle are one or two large sheet-iron stoves around which the men can get at night to tell their stories and dry their clothes, which may have gotten damp during the day's toil in the snow. Each one of these camps is calculated

to accommodate about thirty-five men. Next to this bunk house is the cook house or grub shack, which is slightly smaller, and is equipped with long tables and benches, while at one end of the room is a large modern cooking range where the cook prepares the grub, which consists not only of the proverbial pork and beans but in addition plenty of fish, pork and beef and sometimes venison; there is plenty of good bread and pie and pastry, but usually a scarcity of vegetables, as they are hard to transport without freezing in the cold weather; canned fruit is quite common, and whatever they have is served up in abundance and is rapidly consumed by the men, who have large healthy appetites. The cooking for a crew of thirty-five men is done by one cook, with the assistance of one or two flunkeys. Besides the two main shanties there is a shack for the boss, time keeper and scaler, and a stable for the horses.

The first work in the Fall is the cutting out of the tote roads, which are little more than paths through the undergrowth, and the making of the main haul road, in which considerable care is taken to make it level and straight, as upon the condition of this road depends the rapidity with which the logs may be gotten out to the river, lake or railroad as the case may be. This work is called swamping. The swamping and much of the felling and skidding of the logs down the tote roads to the main haul road is done before the heavy snows come, as it is rather difficult for either men or horses to work in the deep snow off of the main road.

The cutting down of the trees is done with a cross-cut saw and the tree is thrown in the desired direction by means of iron wedges driven into the saw cut. After they are felled they are cut into log lengths and then are hitched together by means of chains and iron dogs, to be drawn to the main road, where they are piled up to be hauled out later in the winter.

When the heavy snows come and the steady cold weather sets in, the hauling by sled to the lake, river or railroad is commenced. Great care is taken to get the road in the best possible condition. The snow, which is from two to four feet deep, is first packed down by hauling light loads over it. After a good firm surface has been made it is finished by going over with a sprinkler, which spreads water in the sled ruts, where in the cold crisp atmosphere it is almost instantly frozen solid, making the loads draw on them almost as easily as if they were on a solid sheet of ice.

The loads which are hauled over these roads are almost incredible in size. The largest load of which I have been able to find a record contained sixty-three large logs, making a load twenty-one feet high by twenty feet wide, weighing one hundred and fourteen tons, and contained thirty-one thousand four hundred and eighty feet of lumber. This was drawn by four horses on a sled that with the chains for binding weighed five tons. The runners on these great sleds are very wide and heavy and are placed nine feet apart. The ordinary load is, of course, not near so large as this, containing usually from seven to twenty thousand feet, according to the conditions of hauling. When they are taken to the lake or river they are piled high on the ice and banks to await the going out of the ice in the Spring.

After the going out of the ice we find the logger or driver, as he is now called, engaged in his most picturesque and dangerous vocation. Especially is this true when the logs are in the river and are in constant motion, when he must run around from one log to another, twisting one here and pulling another there to keep them from jamming. The feats accomplished by these men of the pevee and pike pole, sometimes waist deep in the icy water, are something wonderful. They seem as much at home on a log in the swift current as an ordinary man would on solid ground. However, in spite of their skill and alertness, a jam is sometimes formed and they often have to resort to the use of dynamite to break it up.

Log rolling contests are a common and very interesting sport in the lumber towns of the North. Two men will get on a good sized log and then will try all sorts of tricks to throw each other off. Sometimes they will have the log rolling around so fast that it will just churn the water and they will run with all their might to keep up with it,

when all of a sudden one of them will make a peculiar quick jump, planting his spikes deep in the log and stop it almost instantly, and then if the other fellow does not handle himself just right he gets a ducking in the water and loses the contest. These contests will sometimes last for hours and are exciting from start to finish.

The handling of the logs in the lakes is not quite so hazardous as on the rivers, although it requires no small amount of skill to take care of a great raft of perhaps two million feet. It is interesting indeed to see a powerful little tug boat or alligator puffing along with a tow of logs big enough in area to make a fair sized farm.

These alligators are in some ways a novel craft. They are powerful side-wheeled steamers drawing very little water. They have Lincoln's gunboats (which he said could go anywhere that it was a little damp) beat to a standstill, for they could go down a dusty road. The bottom of the hull is made of very heavy plank and on the front of the boat is a very powerful steam capstan, so that when the mariner wishes to take a land journey he hitches a heavy cable to some good stout trees and winds it in with a capstan, drawing himself along, and by a number of such operations he goes overland to some other body of water he may wish to reach.

In this paper I have purposely omitted the description of the use of modern machinery, which is becoming more and more popular in the logging operations of the great lumber combines, who think nothing of building a standard or narrow gauge railroad for twenty-five or fifty miles to tap some good timber country. It would take another paper for its proper discussion and to me it would take away some of the romance of the hardy men of the river and forest who have been so real to me since childhood.

The lumber jack is just like a great big healthy boy as he comes off of the drive or out of the woods, and as soon as he strikes a town his hard-earned season's wages usually commence to flow out like water and his celebration lasts as long as his money does. To me as I have watched him at his work or at his play or just hanging around town he is an extremely interesting character; jovial, good-hearted and almost invariably ready to tell you a story of his adventures in his broken Swede or his peculiarly accented French or Scotch dialect.

---

## Y. M. C. A. NOTES.

The following officers and committee chairmen constitute the cabinet of the Young Men's Christian Association for the next association year:

| | |
|---|---|
| President | C. W. Post |
| Vice President | R. L. Smith |
| Secretary | R. F. Tyler |
| Treasurer | J. F. Robbins |
| General Secretary | C. W. Rich |

COMMITTEE CHAIRMEN.

| | |
|---|---|
| Bible Study | R. L. Smith |
| Membership | G. W. Trenary |
| Social | H. D. Baylor |
| Finance | J. F. Robbins |
| Missionary | P. L. Bond |
| Religious Meetings | W. C. Knopf |
| Press | Paul Lindeman |
| Music | R. F. Burgess |

Paul Lindeman, chairman of the Press committee, has arrangements about completed for the publication of the Rose Handbook for next year. Some changes are being made in the form of the book, which promise some neat improvements.

Plans are being made for a conference soon on the Fall campaign for next year. Mr. Ralph A. Stone, general secretary of the Purdue Association, is expected to visit Rose sometime this month to help in the conference on this work.

The membership committee is carrying on a vigorous campaign for new members. This work will help very materially in the organization for next year. A new and unique feature in the social work is being worked out by the social committee. It promises to be of general interest to all the men of Rose when it is thoroughly developed.

# PINAFORE

By EDWARD M. BRENNAN.

The Glee Club presented Gilbert and Sullivan's opera, "H. M. S. Pinafore," at the Grand Opera House, Friday evening, April 20, 1906. The success that attended their production of "Little Riding Rood," as given by them last year led them to attempt something more difficult this year. Although "Pinafore" had never been presented before in a school of this size, the boys (and girls) made an enviable reputation for themselves. The play was witnessed by a large audience, every seat on the two lower floors being filled and standing room taken.

THE CREW OF H. M. S. "PINAFORE."

The production on the whole was excellent, the scenery was fine, and the costumes were good. The cast was well taken, and all the characters seemed to be well suited to the parts they played. The chorus did well, and not once did they allow their part to drag, as is usually the case with amateur productions. The work of the chorus showed the effects of thorough practice and rehearsing.

The story of the opera, which, however, is probably already well enough known to require no delineation, is about as follows: Captain Corcoran, commanding H. M. S. Pinafore, anchored off Portsmouth, is on board with his daughter Josephine, when he is visited by Sir Joseph Porter, K. C. B., and a crowd of his sisters and cousins and aunts. At the same time Little Buttercup, the bumboat woman, comes on board also, selling trinkets to the sailors. Now, when Ralph Rackstraw, a sentimental sailor on board the Pinafore, expresses his love for Josephine, his captain's daughter, the thought of her father's rank compels her to refuse him, even though she loves him secretly. Although all his ship-

mates sympathize with him, Ralph becomes discouraged and is about to shoot himself when Josephine appears, knocks the weapon from his hand, and tells him that she loves him. After this incident, with the help of the crew, they plan an elopement. Dick Deadeye, however, not only objects to this plan, but threatens to tell the captain. He carries out this latter plan and the captain frustrates the elopement. The use of some strong language by the captain during this affair, together with an explanation by Little Buttercup that Ralph is really the captain, and the captain, Ralph, causes Sir Joseph to cease pressing his suit for Josephine's hand, and after the captain is reduced to the ranks, he releases her to Ralph. The play ends here with a general wedding, Ralph and Josephine, Sir Joseph and cousin Hebe, Captain Corcoran and Little Buttercup, and boatswain and the aunt.

The cast was as follows:

The Rt. Hon. Sir Joseph Porter, K. C. B.,
First Lord of the Admiralty, . . Ernest D. Kahlert, '06
Captain Corcoran, commanding H. M. S.
Pinafore, . . . . . Emil J. Fischer, '08
Ralph Rackstraw, a sentimental sailor,
. . . . . William C. Knopf, '08
Dick Deadeye, able seaman, . . . Harry M. Shickel, '07
Boatswain, a lively tar, . . . . . Carl B. Andrews, '08
Boatwain's Mate, another, . . . . Richard L. Smith, '09
Midshipmite, a promising sailor, . . . .
. . . . . Warren D. Hussey, Jr., '20

MESSRS. FISCHER, CANFIELD AND KAHLERT IN THE "BELL TRIO."

Josephine, the captain's daughter, . . . .
. . . . . Harry R. Canfield, '06
Little Buttercup, the bumboat woman, . .
. . . . . Richard M. Benbridge, '06
Cousin Hebe, who favors Sir Joseph, . . .
. . . . . Knowles D. White, '06
The aunt, who keeps an eye on the boatswain, . . . . . John H. Wilms, '06

SISTERS, COUSINS, AUNTS.

E. Bradford Hunley, '08. Carroll H. Seldomridge, '07.

| | |
|---|---|
| Bert B. King, '09. | Harold S. Austin, '07. |
| Harvey E. Rogers, '06. | H. Wayne Curry, '09. |
| Berrien M. Lindsley, '08. | S. Eugene Mitchell, '08. |
| George W. Dodge. '08. | Augustin Zambrano, '08. |
| Herbert C. Thomas, '09. | Morris Meyers, '07. |
| Guy V. Woody, '09. | Wallace P. Andrick, '07. |

JOLLY TARS.

| | |
|---|---|
| H. Earl Schmidt, '08. | Charles N. Lammers. |
| Claude L. Douthett, '08. | A. Stanley Adams, '08. |
| Robert J. Wickersham, '09. | Ross M. Stubbs, '08. |
| Charles C. Modesitt, '06. | Roy F. Tyler, '09. |
| Clifford W. Post, '07. | Dwight Wardin, '09. |
| George W. Trenary, '09. | J. Kline Tuthill. '09. |
| John F. Robbins, '08. | Carl W. Piper, '09. |

WARREN HUSSEY, JR., MIDSHIPMITE.

Kahlert, as the Admiral, had one of the most difficult parts of the whole piece, and he played it in a manner deserving of great credit. Fischer, as the Captain, and Knopf, as Ralph, carried two of the other leading roles in an excellent manner. Canfield, as Josephine, looked and acted the part, in a manner that was surprising to see in anyone but a girl herself. Benbridge, in the part of Buttercup, played his part in an entirely original manner. The other parts, Dick Deadeye, by Shickel, the Boatswain, by Andrews, and Cousin Hebe, by White, were well played.

The Glee Club had two enjoyable trips, presenting the opera in the Pythian Theatre at Marshall on Saturday, April 21, and in Shoaff's Opera House at Paris on Monday, April 23.

The play was well managed and directed by the following staff:

General Manager, ..... Carl B. Andrews, '08
Advertising, ..... Ernest D. Kahlert, '06
Costumes, ..... Harry R. Canfield, '06
Music, ..... Harry M. Shickel, '07
Dances, ..... Prof. Oskar Duenweg
Director, ..... Mrs. Allyn Adams
Pianist, ..... Mrs. Nellie D. Cunningham

## Recent Physical Research Applied to Astronomy.

(Abstract from a Lecture delivered before the Scientific Society, on April 7th, by Prof. N. H. Williams.)

Ten years ago the corona of the sun and the tail of the comet were unexplained by the astronomer. The tail of a real fine comet is perhaps a hundred million miles long. It follows the comet head in its approach to the sun, and as the head passes out of the solar system the tail precedes it. This motion is in utter disregard of the law of gravitation, and it is the only motion in the heavens not completely accounted for by this law.

The recent researches whereby the motions of ions have been studied and the mass, velocity, and electric charge of the corpuscle measured, were discussed. Corpuscles having $\frac{1}{700}$ the mass of the hydrogen atom and moving with velocities as high as 120,000 miles per second are now known to be emitted from several of the radioactive substances.

Streams of these corpuscles thrown out from the sun easily account for its corona and the impact of the corpuscles of gas surrounding the comet's head would impart to them the initial velocity of four or five miles per second which has been observed to exist. After the impact the particle carries with it the charge brought to it by the corpuscle and, being continuously repelled by the sun, attains a very high speed. The electric force for the long tails is twelve or fifteen times the gravitational force, and so a new tail is continuously formed and always pointing away from the sun.


## THE Y. M. C. A. HANDICAP.

Friday evening, April 13, a triangular, handicapped indoor athletic contest was held in the Terre Haute Y. M. C. A. The participating teams were from the Terre Haute Y. M. C. A., the Brazil High School and Rose.

The whole affair was more or less of a farce and was easily won by the Poly team, their score being 73 points. Y. M. C. A. was second, with 24, and Brazil had 9 points at the end.

The summary of events is as follows:

15 yd. dash—Turk, R.; Modesitt, R.; Lee, R.;—2 3-5 seconds. All scratch.

Mile run—Payne, B.; Yoss, Y.; Tyler, R.;—5′ 31 2-5″ All scratch.

440 yd. run—McCormick, R.; Smith, R.;—1′ 2 2-5″. Both scratch.

15 yd. hurdles—Modesitt, R.; Lee, R.; Paris, Y.;—2 3-5″. All scratch.

100 yd. dash (elliptical track)—Overpeck, Y., 11 4-5″; Modesitt, R., 12″; Lee, R., 12 2-5″.
Handicaps—Overpeck, 5 yds; Modesitt, 6 yds.

880 yd. run—Worsham, Y., 2′ 11 3-5″; Holden, R., 2′ 13 4-5″; Kelso, R., 2′ 19 2-5″.
Holden and Kelso, 25 yds, handicap over Worsham.

220 yd. dash—Worsham, Y.; Modesitt, R.; McCormick, R.;—26 2-5″. All scratch.

Standing broad jump—Ryan, R., 10′ 5″; Smith, R., 10′ 3-34″; Turk, R., 10′ 1 3-4″.
Handicaps—Ryan, 6 1-2″; Smith, 7″.

12 lb. shot—Turk, R., 43′ 0″; Yoss, Y., 42′ 6″; Horne, Y., 39′ 2″.
Handicaps—Yoss and Horne, 2′ 6″.

Running high jump—Turk, R., 5′ 1″; Lytle, B.; Payne, B. (Tied at 4′ 6″).

16 lb. shot—Turk, R., 33′ 6″; Ryan, R., 26′ 10″. No handicaps.

Pole vault—Willien, R., 9′ 5″; Lee, R., 9′ 0″; Fisbeck, Y., 8′ 0″.
Handicaps—Willien, 5″; Fisbeck, 8″.

## LEAGUE TEAM, 0; ROSE, 1.

April 13 proved a "hoodoo" for the Terre Haute Central League team, as they were shut out by Rose on that date, and have only won one or two games since then.

Schmidt pitched for Rose and was steady and kept his head when he got in a bad hole in the ninth. He struck out more men than the three Terre Haute pitchers combined, his total being 7 against their 5. The game was almost free from errors, and was by no means a "fluke." Rose clearly outplayed the League team at every point.

SCORE BY INNINGS.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9—R. | H. | E. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Rose, | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0—1 | 5 | 1 |
| Terre Haute, | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0—0 | 2 | 2 |

## LEAGUE TEAM, 6; ROSE, 1.

On the 20th of April our team again went up against the Leaguers, but they had evidently come out of their trance and seen that they would have to work to beat us, and as they were determined, we went home the losers. Our team did not play as good ball in this game as they did in the first.

SCORE BY INNINGS.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9—R. | H. | E. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Terre Haute, | 2 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 1—6 | 3 | 2 |
| Rose, | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0—1 | 3 | 4 |

## INDIANA, 4; ROSE, 6.

For the first time in several years the State University team lost to Rose in a base ball game, when they were defeated on the Poly campus, April 21, by the score of 6 to 4. Both sides contributed to the "error" column in the score book, Rose having 5 and Indiana 7.

Although the Indiana team made more safe hits than the Rose men, they were unable to bunch their hits at times when they would be of value.

The game was very exciting because of the closeness of the score, but was not what would generally be considered as a good base ball game.

Indiana was first at bat, Boyle hitting safely for one base, followed by Bradbury sending a grounder to Baylor. Baylor's wild throw over first base and an error at second let both men score. Only one man of the next four reached second and that was on an error. For Rose, Baylor sent an easy fly to Boyle and Miner, after walking to first was forced out on second by Douthett's grounder. Douthett reached third on wild throws by Williamson and Hunter and scored on Frisz's grounder. Heidinger sent a grounder to Williamson, who overthrew first; stole second, reached third on Frisz's sacrifice and stole home. "Friday" was out on an easy grounder to first.

Neither side reached second base until Rose came up in the fourth, then Pritchard, Schmidt and Mooney all scored on a combination of errors and a wild pitch, without a hit having been made.

In the fifth, Bradbury and Moore scored for Indiana, Bradbury on a fielder's choice and Moore on a combination of errors. In this inning, Freudenreich scored for Rose by stealing home.

After that no one succeeded in scoring for either side.

SUMMARY.

| ROSE. | A. B. | R. | H. | S. H. | P. O. | A. | E. |
|---|---|---|---|---|---|---|---|
| Baylor, 3 b., | 3 | 0 | 1 | 0 | 1 | 0 | 1 |
| Miner, c. f., | 3 | 0 | 1 | 0 | 2 | 1 | 0 |
| Douthett, p., | 3 | 1 | 0 | 0 | 2 | 6 | 0 |
| Heidenger, s. s., | 3 | 1 | 0 | 1 | 0 | 3 | 1 |
| Frisz, r. f., | 4 | 0 | 0 | 1 | 0 | 0 | 0 |
| Freudenreich, 1 b., | 4 | 1 | 0 | 0 | 10 | 3 | 1 |
| Pritchard, 2 b., | 2 | 1 | 0 | 0 | 2 | 1 | 0 |
| Schmidt, l. f., | 4 | 1 | 0 | 0 | 1 | 0 | 0 |
| Mooney, c, | 3 | 1 | 0 | 0 | 9 | 0 | 0 |
| Totals, | 29 | 6 | 2 | 2 | 27 | 14 | 5 |

| INDIANA. | A. B. | R. | H. | S. H. | P. O. | A. | E. |
|---|---|---|---|---|---|---|---|
| Boyle, 2 b., | 4 | 1 | 2 | 0 | 4 | 2 | 1 |
| Bradbury, 3 b., | 2 | 2 | 1 | 0 | 0 | 0 | 2 |
| Hare, l. f., | 5 | 0 | 1 | 0 | 0 | 0 | 0 |
| Moore, c f., | 3 | 1 | 1 | 0 | 3 | 0 | 0 |
| McFarren, c., | 5 | 0 | 0 | 0 | 8 | 1 | 0 |
| Rau, r. f., | 3 | 0 | 0 | 0 | 1 | 0 | 0 |
| Hunter (3), O'Donnell (6), 1 b., | 5 | 0 | 0 | 0 | 4 | 0 | 2 |
| Williamson (7), Robinson (2), s. s., | 5 | 0 | 0 | 0 | 4 | 1 | 1 |
| Dunlap (3), Hunter (6), p., | 3 | 0 | 0 | 0 | 0 | 1 | 1 |
| Totals, | 35 | 4 | 5 | 0 | 24 | 5 | 7 |

Struck out—By Douthett, 7; by Dunlap, 2; by Hunter, 5. Base on balls—Off Douthett, 6; off Dunlap, 2; off Hunter, 4. Wild pitch—Douthett.

Umpire—McKenzie.

## INDIANA NORMAL, 1; ROSE, 2.

In the first of a series of three games, which has been arranged with the Normal team, Rose was the victor by the close score of 2 to 1. This game was played at League Park, April 14. A brisk, cold wind was blowing across the field at the time, which made it very easy to make errors, but nevertheless not many were made.

One result of this game was, that it was seen that the Normal team is better this year than last, so we will have to work hard to beat them on their own grounds. Douthett pitched a very good, steady game, having 13 strike outs to his credit, while he walked only 2 men.

Normal started the music when H. Cummins knocked a fly out into left field and scored on Schmidt's error in handling it.

In the second half of this same inning, the second, Heidenger walked, reached second on an error by R. Cummins, was safe on third on Schmidt's sacrifice hit, and scored on Rumer's poor fielding.

In the sixth, R. Cummins knocked a clean three base hit to left, after two outs, but got no further than third, when another out was made. Then Rose again came to bat. After striking out Miner, Mitchell walked Douthett, who stole second, reached third on Rumer's error, and then stole home.

SUMMARY.

| ROSE. | A. B. | R. | H. | P. O. | A. | E. |
|---|---|---|---|---|---|---|
| Baylor, 3 b., | 3 | 0 | 0 | 0 | 0 | 0 |
| Miner, c. f., | 4 | 0 | 0 | 1 | 1 | 0 |
| Douthett, p., | 3 | 1 | 0 | 1 | 2 | 0 |
| Heidenger, s. s., | 3 | 1 | 0 | 1 | 0 | 0 |
| Frisz, r. f., | 3 | 0 | 0 | 0 | 0 | 0 |
| Piggott, 1 b., | 3 | 0 | 0 | 7 | 0 | 1 |
| Pritchard, 2 b., | 2 | 0 | 0 | 2 | 2 | 0 |
| Schmidt, l. f., | 2 | 0 | 0 | 1 | 0 | 2 |
| Mooney, c., | 1 | 0 | 0 | 14 | 1 | 0 |
| Totals, | 24 | 2 | 0 | 27 | 6 | 3 |

| NORMAL. | A. B. | R. | H. | P. O. | A. | E. |
|---|---|---|---|---|---|---|
| Cable, c. f., | 2 | 0 | 0 | 1 | 0 | 0 |
| R. Cummins, s. s., | 3 | 0 | 1 | 4 | 1 | 1 |
| B. Mitchell, p., | 3 | 0 | 1 | 1 | 6 | 0 |
| Meyers, c., | 4 | 0 | 0 | 6 | 0 | 0 |
| Kaser, l. f., | 4 | 0 | 0 | 0 | 0 | 0 |
| C. Mitchell, r. f., | 3 | 0 | 0 | 0 | 0 | 0 |
| H. Cummins, 1 b., | 3 | 1 | 0 | 10 | 0 | 1 |
| Cook, 3 b., | 3 | 0 | 0 | 0 | 0 | 0 |
| Rumer, 2 b., | 3 | 0 | 0 | 1 | 3 | 2 |
| Totals, | 28 | 1 | 2 | 24 | 10 | 4 |

Struck out—By Douthett, 13; by Mitchell, 5.
Base on balls—Off Douthett, 2; off Mitchell, 4.
Left on bases—Rose, 5; Normal, 2.
Three base hit—R. Cummins.
Wild pitch—Mitchell.
Earned runs—None.
Umpire—McKenzie.

## WABASH, 9; ROSE, 1.

The fact that Wabash was able to connect safely with Schmidt's pitched balls to the number of eight times, added to which our team made a few costly errors, accounts sufficiently for our defeat of April 28.

Of the nine runs made by Wabash, three were earned, the runner in each of the other cases having been advanced one or more bases by an error. Schmidt did not seem to have his usual form and could not deliver a ball which would allure the Wabash men into fanning the air.

The support was not all it should have been either, or a different tale would have to be told, although there were several instances where the fielders made very pretty plays. Well, we will hope for better fortune, and playing, next time we meet the Presbyterians.

SUMMARY.

| ROSE. | A. B. | R. | H. | P. O. | A. | E. |
|---|---|---|---|---|---|---|
| Baylor, 3 b., | 5 | 0 | 2 | 0 | 3 | 2 |
| Miner, c. f., | 2 | 0 | 0 | 2 | 0 | 2 |
| Douthett, r. f., p. (3), | 4 | 0 | 1 | 1 | 2 | 1 |
| Heidenger, s. s., | 4 | 0 | 0 | 2 | 1 | 0 |
| Frisz, l. f., | 4 | 0 | 0 | 0 | 0 | 1 |
| Piggott, 1 b., | 3 | 0 | 0 | 15 | 0 | 0 |
| Pritchard, 2 b., | 3 | 1 | 1 | 1 | 3 | 0 |
| Whitlock, r. f. (3), | 1 | 0 | 0 | 0 | 0 | 0 |
| Schmidt, p. (6) | 2 | 0 | 0 | 0 | 3 | 1 |
| Mooney, c., | 3 | 0 | 0 | 6 | 3 | 0 |
| Totals, | 31 | 1 | 4 | 27 | 15 | 7 |

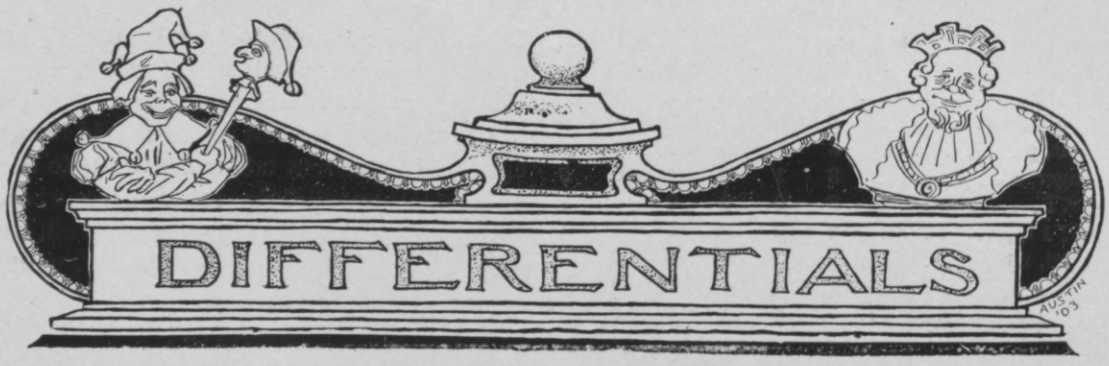
| WABASH | A. B. | R. | H. | P. O. | A. | E. |
|---|---|---|---|---|---|---|
| Diddle, c. f., | 4 | 1 | 0 | 0 | 0 | 0 |
| Hubarth, 3 b., | 4 | 0 | 1 | 0 | 2 | 0 |
| Coen, 1 b., | 4 | 1 | 1 | 10 | 0 | 2 |
| Bolton, 2 b., | 4 | 0 | 1 | 2 | 2 | 1 |
| Harp, c., | 5 | 0 | 1 | 10 | 0 | 0 |
| Myers, l. f., | 4 | 1 | 1 | 1 | 0 | 0 |
| Shepard, r. f., | 3 | 2 | 0 | 2 | 0 | 0 |
| Loutz, s. s., | 2 | 2 | 0 | 1 | 2 | 1 |
| Rubush, p., | 4 | 2 | 4 | 1 | 4 | 0 |
| Totals, | 34 | 9 | 9 | 27 | 10 | 4 |

Struck out—By Schmidt, 4; by Douthett, 1; by Rubush, 9.
Base on balls—Off Schmidt, 1; off Douthett, 0, off Rubush, 5.
Earned runs—Rose, 1; Wabash, 3.
Three base hits—Coen, 1; Rubush, 1.
Left on bases—Rose, 10; Wabash, 5.

---

Dr. Edw. C. Elder, of '86, who has been physician at the Northern Indiana Hospital for the Insane, at Logansport, for the past two or three years, has located at Marysville, Mo., where he will practice medicine. He switched over from the engineering profession to that of medicine in 1900.

Harry A. Schwartz, '01, has been elected Secretary and Treasurer of the Indiana Section of the American Chemical Society. There were present at this meeting Robert Landrum, '04, and Dr. Blanchard of DePauw, formerly a member of the Rose faculty.




The sleeping beauties—Shep and Thomas.

---

Norton, reading German the day after Pinafore:—"Er greift an den Knopf."

---

Mr. Homberger, in Mineralogy:—"Mr. Douthett, what is a play of colors?"

Douthett:—"Pinafore."

---

Hall, '07:—"Where can I find the illuminated slits for this work?"

---

Freshman, in Chem. Lab.:—"Mr. Homberger, where can I get some hydraulic acid?"

---

Johnson, '09, translating French:—"Sometimes the wife of the daughter does the 'singing.'"

---

Sproull, '09, translating German:—"*Der Vollmond*, the fool moon."

---

Dutch McCormick:—"You fellows can talk all you want to about the Normal, for my girl doesn't go there any more."

---

Young lady, to Fatty Beck:—"Oh, Mr. Beck, I saw two carloads of you coming home from the base ball game today!"

---

White, '09, translating German derived adjectives:—"*Grasgruen*, green as grass; *hellgruen*, green as ——."

---

A poster seen some time ago on Mulberry street displayed the following information:—"H. M. S. Pinafore, or the Lass that Loved 42—People—42."

Jojo:—"I once knew a high school professor who did not understand this simple question."

Turk:—"Professor, did you say he was a Normalite."

---

Doc. White, in Freshman chemistry:—"Mr. Stevens, can you give me the formula for sulphuric acid?"

Stevens:—"It is HKNOS, isn't it?"

---

White, '09, translating German:—"Of all the languages German is the most buxom."

---

Dodge, '08:—"Say, I've got a joke for THE TECHNIC."

"What?"

"Lindsley proved today that 480 was equal to zero."

---

Mac, fondling his beloved Nagle, to '08 civils: "I don't expect this to take the place of your Bibles, but I want it to come pretty close to it." And *this* to the class of '08!

---

Wicky:—"Now some one give me an example in English of a passive verb."

Bernhardt:—"I am stung, I was stung ——"

Voice from rear:—"You will be stung."

---

Dr. Johonnott, explaining a theory in Physics the day of the second Poly-League game: "I'm just as sure that this is true as I am that the Poly team will win this afternoon."

P. S. After a microscopic examination of the score, one is led to believe that the Doctor's theory will have to be sent to the shop for repairs.

Burgess:—"I haven't any use for a language that will call *Maedchen* neuter."

Bennett:—"Well, if 'man' had an ending like that, he would be neuter, too."

---

A Marshall small boy was given a quarter by a member of the Pinafore troupe with written instructions to buy with it a box of rouge. He returned after having made the rounds of the town, with a satisfied smile and a box of Rough-on-Rats.

---

After the finals are over,
After the race is run,
The Juniors will be Seniors,
The Seniors will be done.

## EXCHANGES.

SO SAD.

"Oh, why didst thou the black crow kill?"
A maid to a hunter cried.
"Because my dear he gave me caws."
* * * * *
She lingered a week then died.

—[*Madisonensis.*

---

"Say, how did you get off in the Glee Club try-out?"

"Made first base on four bawls." —[*Ex.*

---

The Georgia School of Technology has received twenty thousand dollars from Andrew Carnegie for the extension of their library.

---

Last night I held her hand in mine,
Her hand so slender and divine,
Endowed with all the graces:
But now another hand I hold,
A hand full worth its weight in gold;
Just think, a hand of aces. —[*Ex.*

"Your son is making a specialty of chemistry isn't he?"

"Yes. When he goes into business he's going to start a maple syrup factory."

—[*Case Tech.*

---

Harvard has an Esperanto Society for the study of the universal language. —[*The Tech.*

---

La Esperanto Klubo de Washingtono Universitato was organized at Washington University on January 9th to study Esperanto.

—[*Student Life.*

---

The editors of *Case Tech* publish the answers received from students to a series of questions in regard to the smoking habit. To the question, "Could you discontinue the habit without serious inconvenience?" 99 per cent of those who answered, said "Yes," and to the question, "Would you like to discontinue it?" 99 per cent answered "No." The remaining one per cent has our best wishes.

---

How they sing it in Boston:

Everyone labors except our distinguished progenitor;
He reposes in a recumbent position within our residence through the day,
His pedal extremities idling upon the bronze of the steam radiator,
Serenely engaged in extracting nebulous atmosphere from a tobacco receptacle of mundane matter.
Our maternal mentor receives soiled linen for the purpose of cleansing it,
And in this connection I should include filial Ann;
Indeed everybody is engaged in some variety of occupation in our domestic habitat,
Excluding, as primarily suggested, our distinguished progenitor. —[*Ex.*

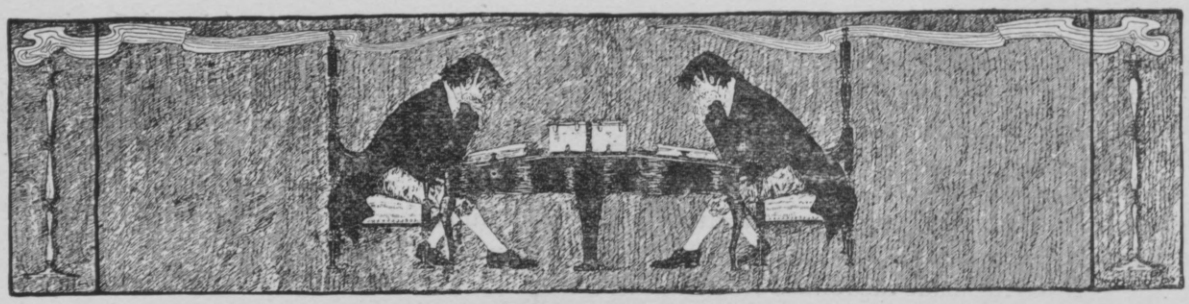
---

A. Balsley, '91, who has been Electrical Engineer for the Georgia Railway & Electric Co., at Atlanta, is now Engineer for the Sao Paulo Tramway, Light & Power Co., at Sao Paulo, Brazil, S. A. His New York address is 25 Broad street.

F. W. Hahn, '04, has taken a position with the Roger Ballast Car Co., Chicago.

---

Herbert E. Shryer, '05, has taken the position of Chemist to the American Tin Plate Co., at Elwood.



# REVIEWS

### Robert Fulton Memorial.

In connection with the proposed celebration of the centennial of the inauguration of steam navigation on the Hudson River, a movement is on foot to raise funds for the erection of a memorial to Robert Fulton. The movement was opened in a public sense by a lecture by Mark Twain at Carnegie Hall the evening of April 19, the proceeds of which are to go to the fund. This was announced as Mr. Clemens' farewell lecture and was delivered in his old time and best manner. It was concluded with a touching appeal for relief for the smitten city of San Francisco, where he lived for three or four years in the 60's as a reporter of *The Call*. The great hall was filled to its capacity.—[*American Machinist.*

### An Independent Electric System for Railway Cars.

The "*Electrical Age*" for April, 1906, contains a description of a gasoline-electric car, designed by the Strang Electric Railway Car Co., of New York, for use on steam roads, to meet the competition of parallel electric lines. The driving apparatus consists of a six-cylinder gasoline engine, driving a generator, which, in turn, furnishes power for the two motors which drive the car. A storage battery, connected in parallel with the generator, acts as an equalizer. When running under ordinary conditions, the current goes directly to the motors, but when coasting down grade, slowing up, or standing still, the battery takes up the surplus current and gives it out again when starting or climbing steep grades.

The great advantage claimed for this system is that it requires an engine only large enough to develop the average power used, as the excess power developed under light load is stored up to be used under heavy load.

The electrical apparatus consists of a 50-KW. 250 volt, direct current generator, direct connected to the gasoline engine, two 50-H.P., series wound street car motors, two controllers and a storage battery of 112 cells, with a capacity of 200 ampere-hours, carried in a cradle under the middle of the car.

The maximum speed which can be obtained is 50 miles per hour. The average gasoline consumption is 0.45 gallon per car mile. One hundred gallons of gasoline are carried, giving a mileage radius of 225 miles.

### An Auxiliary-Pole Motor.

In many classes of work a wide speed variation is required, and to meet the demands of such service the Westinghouse Electric & Manufacturing Co., of Pittsburg, has developed a line of direct-current motors having a speed range of 4 to 1 on a single voltage. This speed variation is obtained by varying the field of the motor.

The motor is similar to other motors, but has in addition auxiliary poles and coils. These poles are introduced to strengthen the field and thus give the wide range of speed. The auxiliary poles are bolted to the frame and placed midway between the main poles. These poles do not introduce any complication in the machine, as all that is necessary to put these poles in operation is to connect them in series to the main poles.

The auxiliary poles are placed as near to the armature as mechanical considerations will per-

mit and their turns are concentrated at the end of the pole. This arrangement is much more effective, it is claimed, than the distribution of the ampere-turns along the length of the auxiliary poles.

The magnetic field of the auxiliary winding acts in direct opposition to that produced by the armature current. The resultant field is thus made up of three parts—that due to the shunt winding, that due to armature reaction and that due to the auxiliary poles. Good commutation is thus maintained over a large range of speed.

The motors are shunt wound, and for each point of the controller give a definite speed, which is nearly constant for all loads. Overloading is permitted without excessive or injurious sparking. The motors can be reversed by changing the external connections.

Claim is made by the manufacturers that the motors will develop their full rated output throughout their entire range of speed. An overload of 25 per cent may be carried for one hour without injury to the motor. The motors are thoroughly cooled and ventilated. The efficiency is high and the speed regulation practically exact.

---

### The Fixation of Nitrogen.

*Harper's Magazine* for April, 1906, contains an article by Professor Robert Kennedy Duncan, of Washington and Jefferson College, on "The Fixation of Nitrogen," which will not only be interesting to the student of chemistry, but to others as well.

It is a well-known fact that nitrogen must be in combination with other elements before it can be utilized in supporting life, and as the supply of available nitrates is exceedingly limited, chemists have in the last few years devoted a great deal of time in trying to find some way of converting the free nitrogen of the air into useful nitrogen compounds, and the object of Professor Duncan's paper is to present the various modern attempts to solve the problem of transforming in large quantities the free and useless nitrogen into the fixed and useful kind. Among those who have succeeded to a great extent in solving this problem the author mentions Messrs. Bradley and Lovejoy of the Atmospheric Products Company at Niagara Falls. Their method consists essentially of passing air into suitably arranged sparking chambers, where there are formed no less than 400,000 arcs a minute, and each spark as it forms burns a small per cent. of the incoming air into oxide of nitrogen, and this oxide on passing out is caught in absorbing towers of water with the formation of nitric acid.

Another method is that discovered by Professor Adolph Frank, a German chemist. He found that atmospheric nitrogen reacted with red-hot calcium carbide in accordance with the equation

$$Ca\ C_2 + 2N = Ca\ CN_2 + C$$

Under the name of Kalkstickstoff this calcium cyanamide is now in the market of the world.

In manufacturing this substance they employ the latest results of technical science. The nitrogen of the air must be separated from the oxygen with which it is mixed; to do this they liquify the atmosphere and separate the two substances by fractional distillation. The oxygen passes off, but the nitrogen passes suddenly from the intense cold of the liquid air into the highest heat of the electric furnace, where, through contact with a mixture of coke and lime, it is caught and transformed into Kalkstickstoff.

And thus it seems that although the supply of natural nitrates may give out within the next two or three scores of years, the ingenuity of man will have by that time solved the problem of the production of this great necessity of life.

THE TECHNIC EDITORIAL BOARD, 1905-06.